



ATTACHMENT A

REMARKS

Applicants herein submit the enclosed remarks in response to the Final Rejection in light of the Advisory Action dated August 10, 2004. For reasons as stated in detail below, Applicants submit that the present claims are patentable over the cited prior art, and that the present application is in condition for immediate allowance.

Previously, in the final rejection, Claims 7, 8 and 10 were rejected under 35 U.S.C. § 103 on the basis of JP 6-22870 in view of the Logsdon patent, and Claims 9, 11 and 12 were rejected under 35 U.S.C. § 103 on the basis of the combination of references cited against Claims 7 and 10, further in view of EP 1192981. These rejections, and the comments of the Examiner in the Advisory Action, are respectfully traversed for the reasons as stated below.

In the Advisory Action, the Examiner stated that "Hence, one of ordinary skill in the art would use any method of making the catalyst including the method of Logsdon because such method is effective to produce a catalyst." Applicants submit that this statement is in error because, for reasons as stated below, there is no motivation to combine the Logsdon reference with JP 6-22870 because the present invention is completely different from these references with regard to the problem to be solved. In fact, the Logsdon reference and JP 6-22870 differ from each other with regard to the problem to be solved and thus cannot be combined in the manner done by the Examiner.

(1) The Present Invention (Claims 7-12)

Regarding the problem to be solved, the present specification states as follows.

“However, there is a serious impediment to using iron type desulfurizing agents or nickel type desulfurizing agents as is in the desulfurization of steam reforming processes. Specifically, desulfurization in ordinary steam reforming processes is performed in the presence of hydrogen, and this hydrogen is supplied by recycled gas from the outlet port of a reformer. This recycled gas contains CO and/or CO₂ as well as hydrogen. Accordingly, in the presence of an iron type or nickel type desulfurizing agent, a reaction of hydrogen with CO and CO₂ (methane forming reaction) occurs, which is accompanied by the problem of a large amount of heat generation.” (See the specification, page 4, line 21 to page 5, line 7).

Thus, the present invention achieves the solution of the problem of a large amount of heat generation. In particular, the claimed invention is directed to a hydrocarbon desulfurization method which is characterized in that a hydrocarbon raw material is desulfurized in the presence of hydrogen using the specific desulfurizing agent obtained by the method of original claim 1.

Accordingly, in the present invention, the heat generation can be avoided or suppressed. This fact is clear from the Example of the present invention. For example, by comparing the results shown in Example 6 and Comparative Example 5, it is evident that no rise in temperature due to a methane forming reaction is seen in Example 6 whereas a temperature rise caused by a methane forming reaction in Comparative Example 5. Though the numerical value of the temperature rise is not mentioned in the present specification, the value is about 20-30°C.

The present invention thus greatly differs from the cited prior art references as explained further below.

(2) The Cited References

The Logsdon Patent

Regarding the problem to be solved, Logsdon sets forth that *"The present invention relates to the catalytic hydrogenation of aldehydes to alcohols. The present invention specifically pertains to an improved catalyst and a catalytic process for hydrogenating aldehydes to alcohols with a significant improvement in selectivity evidenced by a reduction in the production of undesired by-products."* (See column 1, lines 11-17).

Logsdon also states that *"The present invention provides a catalyst and a catalytic hydrogenation of aldehydes to alcohols which maximizes the production of the desired alcohol product and significantly reduces by-product ester and ether formation relative to prior catalysts."* (See column 2, lines 56-60).

Thus, Logsdon purportedly aims to solve the problem of the production of by-products (ester or ether) in the hydrogenation of aldehydes.

JP-06-22870

Regarding a problem to be solved, JP 06-22870 discloses that its purpose is *"To develop a desulfurizing agent which makes it possible to efficiently and sufficiently remove sulfur compounds from hydrocarbons even under relatively low pressure to thereby provide a desulfurizing method wherein the desulfurizing agent is used to efficiently remove sulfur compounds from feedstock hydrocarbon for various fuel cells and which can be advantageously utilized for a fuel cell system."*

Thus, the problem to be solved of the present invention is not taught by Logsdon and JP 06-22870 at all, nor do they disclose or suggest a solution to the problem solved by the present invention.

Despite this, the Examiner asserts that *"Hence, one of skill in the art would use any method of making a catalyst including the method of Logsdon because such method is effective to produce a catalyst."*

However, Logsdon merely discloses that the method is effective to produce the special catalyst (i.e., catalyst for hydrogenating aldehydes to alcohols). Logsdon fails to disclose not only a catalyst for desulfurizing hydrocarbon, but also the problem to be solved (i.e., a large amount of heat generation).

On the other hand, JP 06-22870 is directed to a desulfurization of feedstock hydrocarbon for fuel cell, not to a hydrogenation of aldehydes. In addition, there is no disclosure of the problem to be solved in the present invention.

Even if those skilled in the art (desulfurizing field) were aware of Logsdon, they would not employ the teachings of Logsdon relating to a hydrogenation of aldehydes. If a catalyst for hydrogenation of aldehydes is used in reactions other than hydrogenation of aldehydes (e.g., desulfurization of hydrocarbon), those skilled in the art would not expect the catalytic function (effect) in the reaction. Thus, it would not have been obvious to those skilled in the art that Logsdon could be applied to JP 06-22870.

Moreover, those skilled in the art would not expect the advantages of the present invention (i.e., the effective suppression of heat generation) from either Logsdon or JP 06-22870 because these references fail to disclose or suggest the problem to be solved in the present invention.

There is thus no motivation to combine Logsdon merely disclosing hydrogenation of aldehydes with JP 06-22870 directed to desulfurization of hydrocarbon, and the hydrocarbon desulfurization method (Claims 7-12) of the present invention is thus clearly patentable over the combination of these references.

Accordingly, the present claims 7-12 are clearly not anticipated or made obvious by the cited references and are thus patentable over the cited references. Applicants thus submit that the Examiner's rejections on the basis of the combination of Logsdon and JP 06-22870 are respectfully traversed and should be withdrawn.

In light of the arguments as set forth above, Applicants submit that the present application overcomes all prior rejections and is in condition for allowance. Such action is respectfully requested.

END REMARKS